Blakely, Sokoloff, Taylor & Zafman LLP   (310) 207-3800
Title: UTILIZING AN ADVANCED LOAD ADDRESS TABLE FOR
MEMORY DISAMBIGUATION IN AN OUT OF ORDER PROCESSOR
1st Named Inventor: Gary N. Hammond
Express Mail No.: EV339916357US   Docket No.: 42P18219
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PROCESSOR
101

PIPELINE
105

CACHE
103

MONITOR
111

GRAPHICS
PROCESSOR
109

HUB
107

MEMORY
113

I/O DEVICES
119

I/O HUB
115

STORAGE
117

COMMUNICATIONS
DEVICE
121

NETWORK
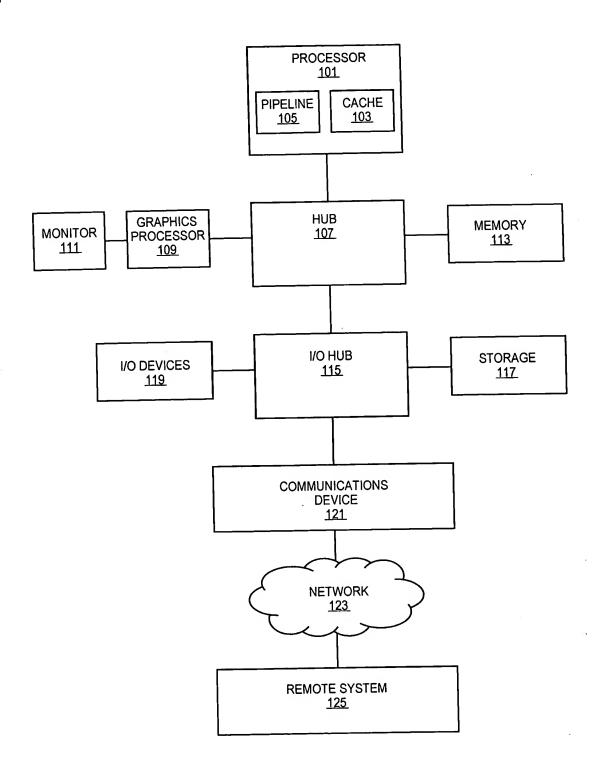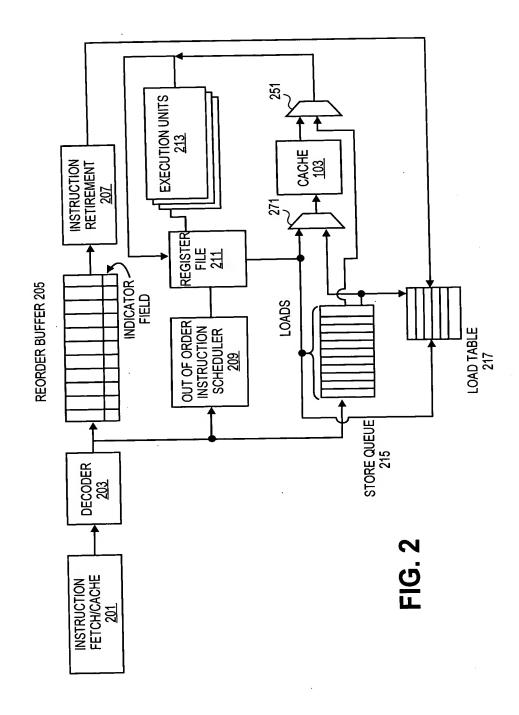123

REMOTE SYSTEM
125

FIG. 1

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FIG. 2

217

301   303   305   307

V	RegId	Addr	Size Mask
V	RegId	Addr	Size Mask

309

311

FIG. 3

401 { St8 [r2] = r2

403 { Ld2 r3 = [r4]

421

Ld2.a r3 = [r4]   } 405

St8 [r2] = r2   } 401

Ld2.c r3 = [r4]   } 409

423

FIG. 4

SCHEDULE EXECUTION
OF LOAD
501

CHECK FOR
CONFLICTING PRIOR
STORES IN QUEUE?
503

FOUND   NONE

UTILIZE CACHE
DATA
507

NO   DATA IN
STORE QUEUE?
515

UNKNOWN

SPECULATE ON
LOAD DATA
509

YES

UTILIZE STORE
QUEUE DATA
505

ALLOCATE LOAD
ENTRY IN TABLE
511

MARK LOAD IN
ROB AS A SPECULATIVE
ADVANCED LOAD
513

FIG. 5

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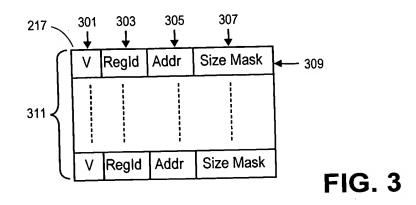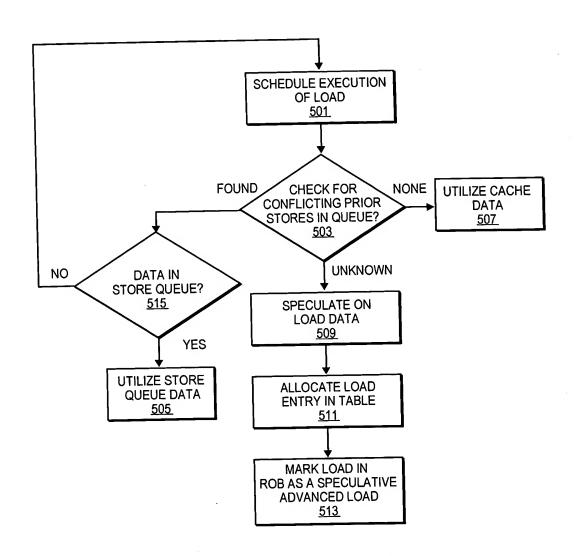MEMORY DISAMBIGUATION IN AN OUT OF ORDER
PROCESSOR
1st Named Inventor: Gary N. Hammond
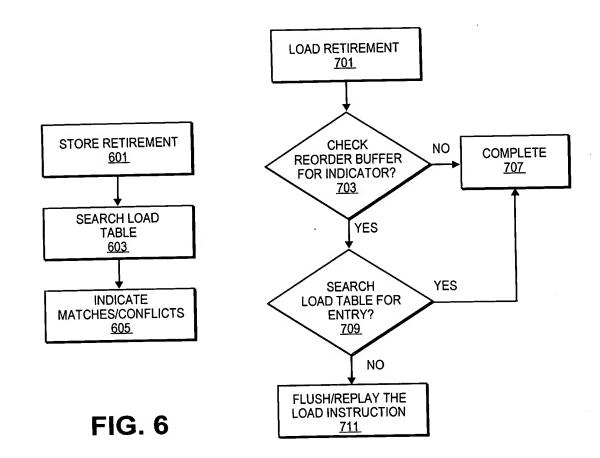Express Mail No.: EV339916357US   Docket No.: 42P18219
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```
                                    ┌──────────────────────┐
                                    │   LOAD RETIREMENT    │
                                    │         701          │
                                    └──────────────────────┘
                                               │
                                               ▼
                                          ╱─────────╲
  ┌──────────────────────┐              ╱   CHECK    ╲        NO    ┌──────────────────┐
  │   STORE RETIREMENT   │             ╱ REORDER BUFFER╲─────────────│    COMPLETE      │
  │         601          │             ╲ FOR INDICATOR?╱             │       707        │
  └──────────────────────┘              ╲    703     ╱              └──────────────────┘
             │                            ╲─────────╱                        ▲
             ▼                                 │ YES                         │
  ┌──────────────────────┐                     ▼                            │
  │    SEARCH LOAD       │                 ╱─────────╲                      │
  │      TABLE           │                ╱  SEARCH    ╲       YES          │
  │        603           │               ╱ LOAD TABLE FOR╲──────────────────┘
  └──────────────────────┘               ╲   ENTRY?    ╱
             │                            ╲    709     ╱
             ▼                             ╲─────────╱
  ┌──────────────────────┐                     │ NO
  │     INDICATE         │                     ▼
  │ MATCHES/CONFLICTS    │         ┌──────────────────────┐
  │        605           │         │  FLUSH/REPLAY THE    │
  └──────────────────────┘         │  LOAD INSTRUCTION    │
                                   │         711          │
                                   └──────────────────────┘
```

FIG. 6

FIG. 7